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Brief 69-10747

NASA TECH BRIEF

Battery Charge-Discharge Controller

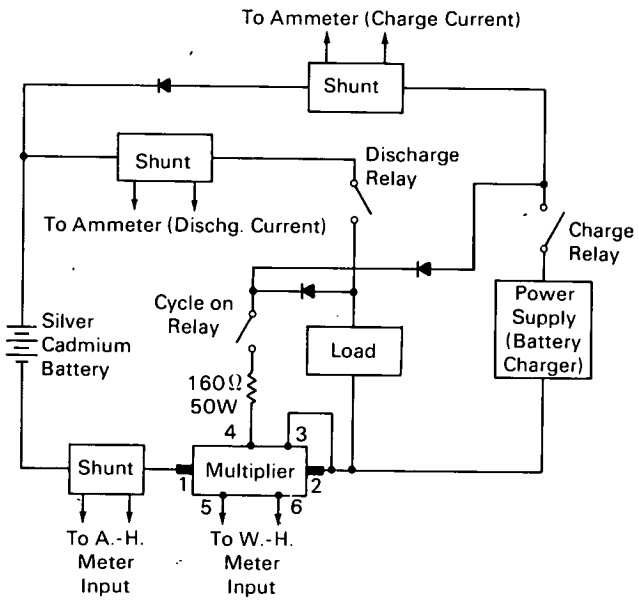

Figure 1. Simplified Block Diagram

A recently designed charge-discharge controller contains some new and unusual features. An example is the punched-tape programmer that provides the capability for programming 305 discrete steps in the battery load. The indicating instrumentation includes meters for the indication of ampere-hours, watt-hours, voltage, current, and internal temperature and pressure. Batteries may be tested under a constant or programmed load.

A standard 19-inch by 7-foot cabinet houses the equipment. Indicating instruments, control timers, air filters, and control switches are located on the cabinet front panel. In addition to the visual displays, the controller generates analog signals for recording the displayed data. Two safety provisions are incorporated in the controller: a low-voltage contact that protects the battery against reversal during discharge and a high-voltage contact that energizes a warning light during a battery overcharge condition.

The controller circuitry includes three shunts (refer to illustration). One shunt is across the charge-indicating ammeter, a second is across the discharge-indicating ammeter, and the third is across the ampere-hour meter. A multiplier, shunted across the watt-hour meter, provides a signal that is proportional to the EI product; this signal is then integrated for the correct watt-hour indication.

The controller requires 110-volt, 60-Hz, 3-phase power, 20 amperes per phase. Phases A and B are connected to separate power supplies, phase C supplies power for the instrumentation and the timers.

Two-step charge control is employed. The battery is initially charged at a constant rate until a predetermined limiting voltage is reached; the charge current then decreases due to increasing battery potential. When the decreasing charge current drops to a predetermined value, the charge voltage is reduced to the equivalent of a trickle charge which continues until a discharge condition exists.

Notes:

1. Applications of this equipment are indicated where detailed information on a battery bank is needed or where precise battery charging is required.
2. Requests for further information may be directed to:

   Technology Utilization Officer
   Manned Spacecraft Center, Code BM7
   Houston, Texas 77058
   Reference: TSP69-10747

(continued overleaf)

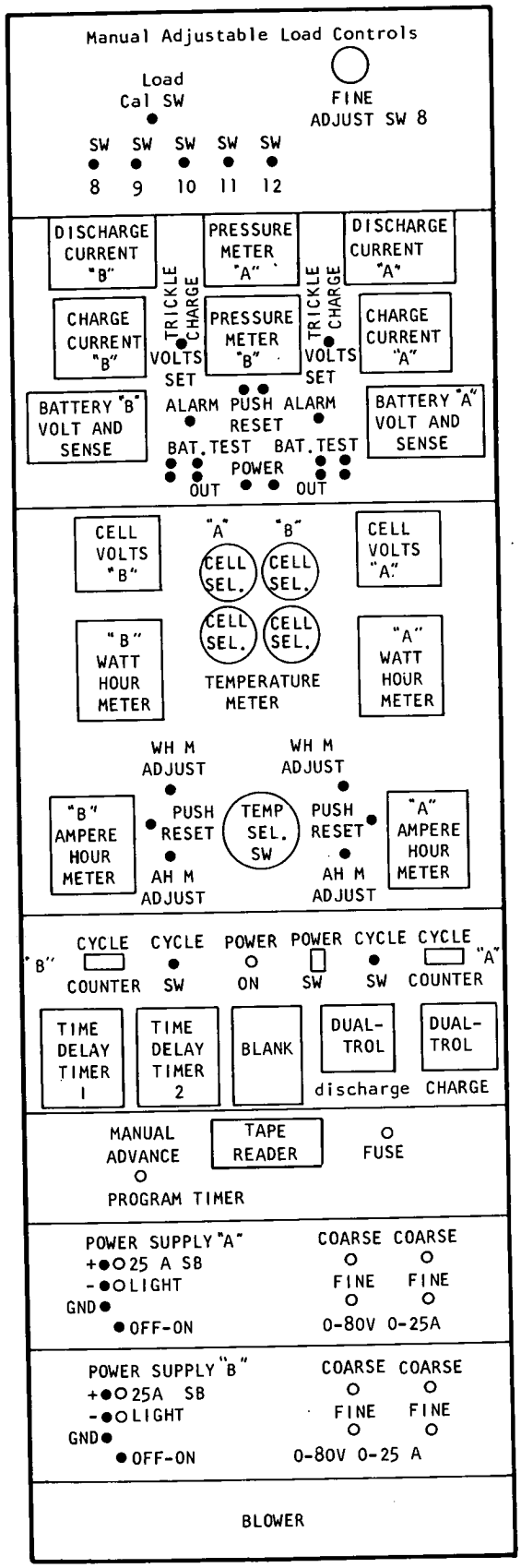

Figure 2. Front Panel

Patent status:

No patent action is contemplated by NASA.

Source: A. D. Ciccanti of
The Boeing Company
under contract to
Manned Spacecraft Center
(MSC-11836)